

# Assessing Military Use of Training Areas Using A Geographic Information System



## Fort Hunter Liggett, CA

Arthur W. Hazebrook, MS.

ITAM Coordinator

PARSONS

MAY 2010

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>JUN 2010</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2010 to 00-00-2010</b>	
4. TITLE AND SUBTITLE <b>Assessing Military Use of Training Areas Using A Geographic Information System</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Army Garrison Fort Hunter, Liggett, CA, 93930</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>Presented at the NDIA Environment, Energy Security &amp; Sustainability (E2S2) Symposium &amp; Exhibition held 14-17 June 2010 in Denver, CO.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>46</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# **PARSONS**

**INFRASTRUCTURE & TECHNOLOGY**

---

## **Mr. Mark Wald**

Vice President, SRP Program Manager  
Parsons Infrastructure & Technology (PI&T)  
Richmond, Virginia, USA  
Comm: 804. 327. 7457  
Email: Mark.Wald@parsons.com

## **Mr. Rick Weatherford**

ITAM Program Manager  
Parsons Infrastructure & Technology (PI&T)  
Richmond, Virginia, USA  
Comm: 804. 327. 7468  
E-mail: Richard.Weatherford@parsons.com

## **Mr. Art Hazebrook**

ITAM Coordinator,  
Army Garrison Fort Hunter Liggett, CA, USA  
Comm: 831. 386. 2305  
DSN: 686. 2305  
E-mail: Art.Hazebrook@us.army.mil

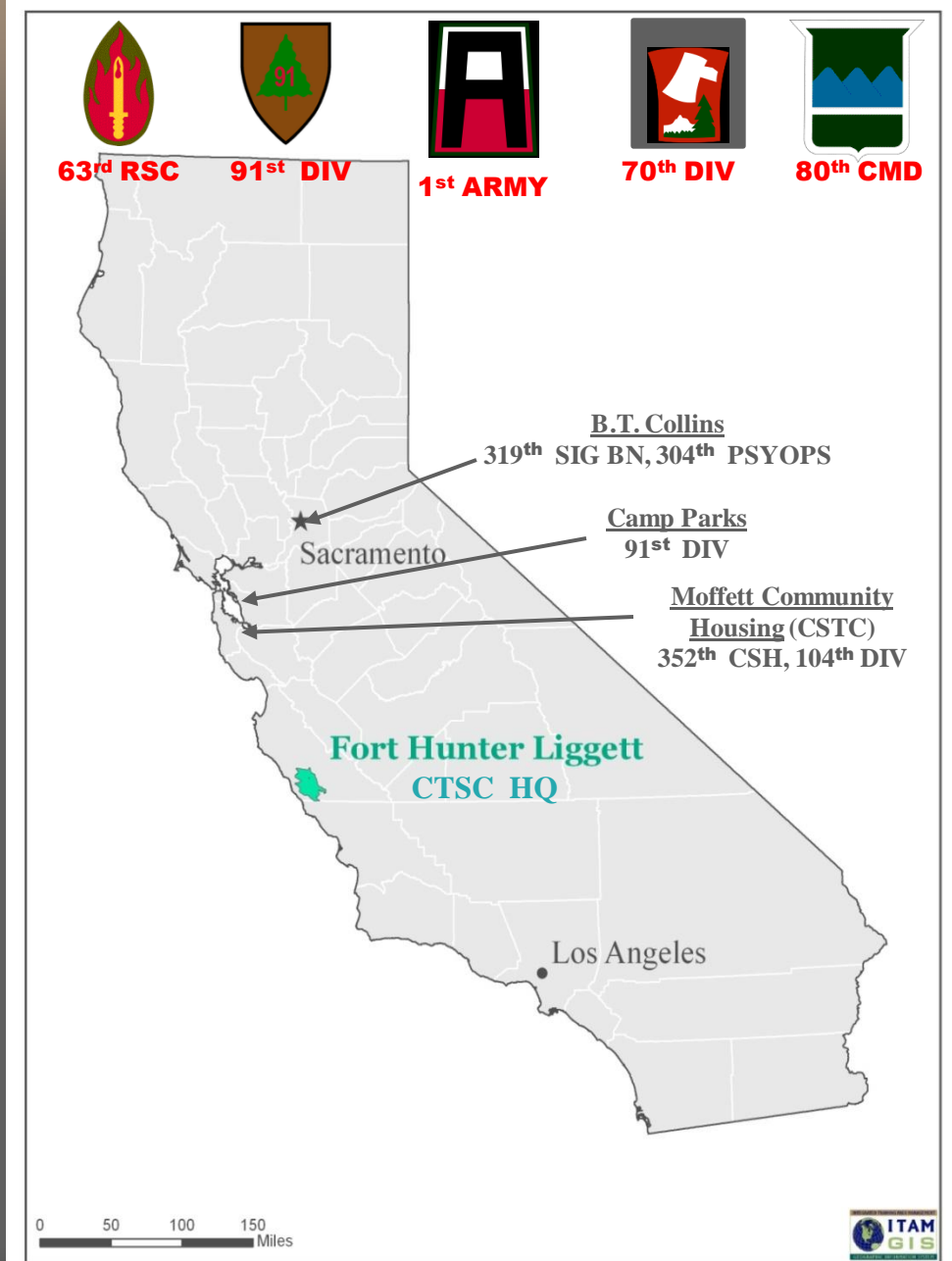


The views expressed during this presentation are those of the author and do not necessarily represent the views of the Federal Government, Department of Defense, United States Army or Fort Hunter Liggett.

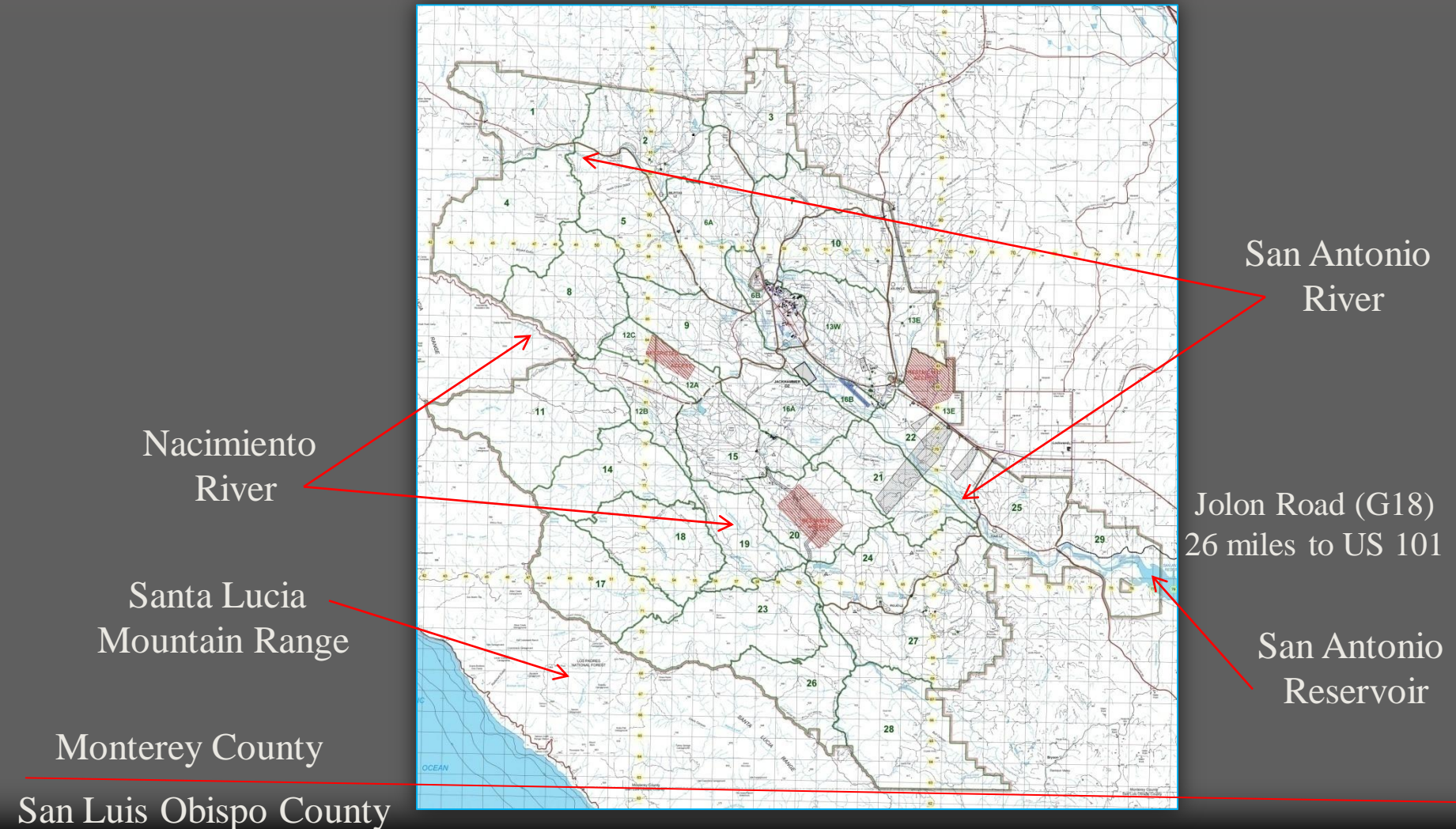


Fort Hunter Liggett (FHL) is the nations largest U.S. Army Reserve Command training installation and is the eighth largest Army facility in the continental United States.

FHL is a part of the Combat Support Training Center (CSTC) complex of USARC/IMCOM properties and strives to be the premier training site in the western United States.



Fort Hunter Liggett covers 65,518 hectares (161,900 acres / 253 miles<sup>2</sup>) in southern Monterey County and is considered to be one of the last remote training sites remaining in California.



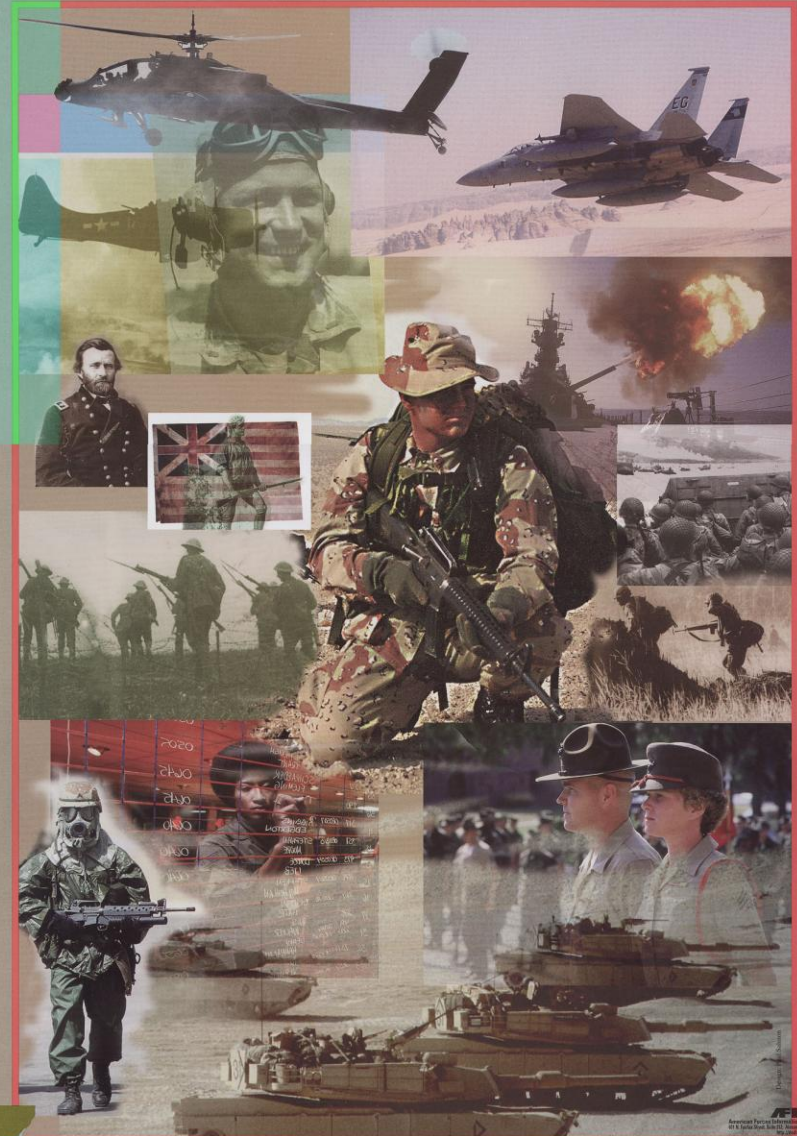


FHL has been actively training military personnel since 1940.

Training and technology testing over the past 70 years has included all branches of the Department of Defense (DoD) and emphasized infantry maneuvers, engineering and construction activities, aviation exercises, wheeled and tracked vehicle maneuvers, and the use of high explosives.

“History does not entrust the care of freedom to the weak or the timid.”

President Dwight D. Eisenhower  
Inaugural Address, 20 January 1953



## Defense

**FIS**  
American Foreign Information Service • Department of Defense  
411 N. Taylor Street, Suite 151, Ann Arbor, MI 48106-3887 734-485-4083, 734-485-4545  
www.fis-usa.com (also web site)

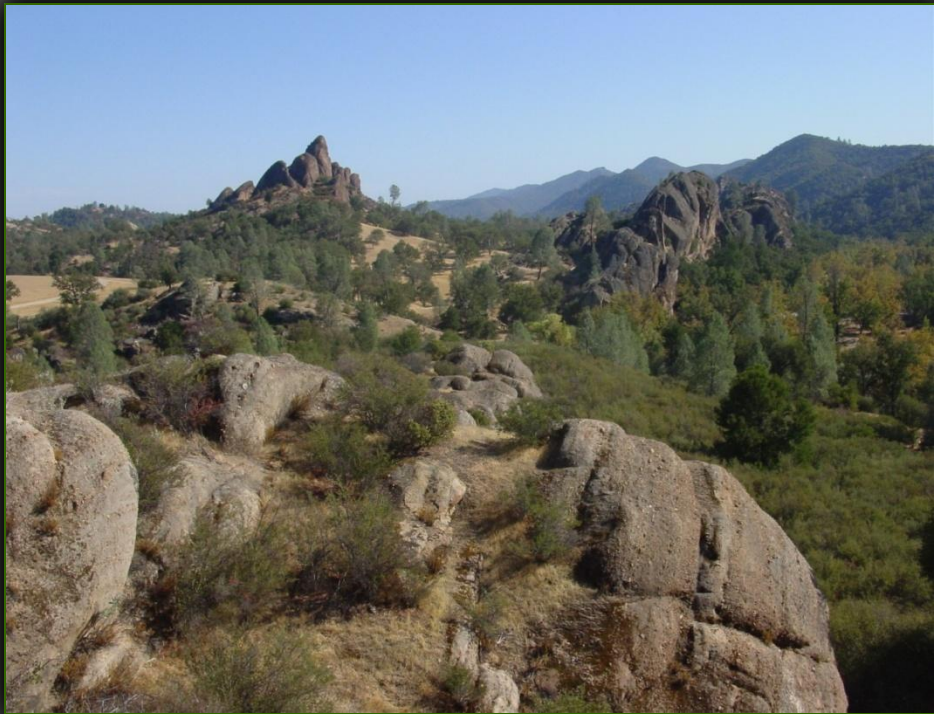


FHL is located 16 kilometers (10 miles) east of the Pacific Ocean and lies between the crest of the Santa Lucia Mountain Range to the west, and the Salinas River Valley to the east. Elevation ranges from 260-1,220 meters (850 to 4,000 feet) above sea level.





Training Area conditions range from open grass covered valleys to rugged coastal mountains. Cover and concealment resources range from annual and perennial grasslands, coastal scrub, oak woodlands and oak savanna, chaparral, mixed evergreen forest, rock outcrop, riparian and vernal pool/swale plant communities.





# Integrated Training Area Management Program

- Initiated by the U.S. Army in the 1980's in response to severe degradation of its training lands.
- The ITAM program maintains training lands so that they may meet Army doctrinal standards now and in the future.
- Program administration requires understanding and balancing the Army's training requirements with conservation of soils, flora and fauna.
- Combines five components that provide the means to: (1) understand how the Army's training affects land and water resources, (2) mitigate and repair those impacts, and (3) communicate this information to military trainers and civilian agencies using the installation.

## Integrated Training Area Management **SEIBERT STAKES**



SEIBERT Stakes are used on military training lands to mark areas which are currently "OFF-LIMITS" to training or maneuver activities.

SEIBERT Stakes are used to mark areas that need protection because of excess erosion or other physical hazards, areas that are being rehabilitated, agricultural fields, and other environmentally or culturally sensitive areas.

For safety reasons, it is critical that you stay clear of all areas that are marked with SEIBERT Stakes or any other off-limits signs, particularly the hazardous areas with bone-breaking gullies, or those that are under repair and being stabilized with vegetation.



Enhance your training by instructing your troops to think of off-limits areas as minefields, areas contaminated with a persistent chemical agent, or other simulated tactical positions when planning and executing training exercises.

For more information on Fort Hunter Liggett's ITAM efforts, or locations of off-limits areas, contact the ITAM Coordinator at 831. 386. 2305.

# Integrated Training Area Management Components

- **RTLA - Range and Training Land Assessment**
  - Physical and biological based assessments are used to relate land conditions to training intensity and to prescribe proper land management practices.
- **LRAM - Land Rehabilitation and Maintenance**
  - Provide proactive and reactive land management techniques that promote sediment control and native vegetation enhancement.
- **SRA - Sustainable Range Awareness**
  - Minimize environmental disturbance of training lands by providing educational tools targeting common sense solutions.
- **TRI - Training Requirements Integration**
  - Integrate immediate and long-term military training requirements with natural and cultural resource management processes.
- **GIS - Geographic Information Systems**
  - Provide standardized mapping products, spatial data and software application support as well as tracking training area usage.



Wherever troops are training...there is disturbance!





...in one form or another !!

























The Problem: Keeping track of troops in the field.  
Some don't want to be found...





Others do...sorta.





The Solution: make selected hourly radio checks a Standard Reporting Procedure. Units in the field are required to radio in their coordinates, unit size and vehicle numbers four (4x) times daily (0800, 1200, 1600 and 2000 hrs.)



These data points, along with attribute data (armed-service component, unit designation, company size, type of training, and number of wheeled and tracked vehicles) are input into a Geographic Information System (GIS) database.

ArcView GIS 3.3

File Edit Table Field Window Help

8 of 317 selected

Attributes of Branch.shp

Shape	BRANCH	Unit	grid coord	x coord	y coord	ST DATE	END DATE	#days
Point	USA	2-75 RGR	59808880	659800	3988800	19980119	19980119	1
Point	USA	2-75 RGR	58407730	658400	3977300	19980124	19980125	2
Point	USA	2-75 RGR	53508270	653500	3982700	19980125	19980123	6
Point	USA	2-75 RGR	58507770	658500	3977700	19980123	19980123	1
Point	USA	2-75 RGR	61407130	661400	3971300	19980124	19980125	2
Point	USA	2-75 RGR	69077673	669070	3976730	19980126	19980128	3
Point	USA	2-75 RGR	62808730	662800	3987300	19980128	19980128	1
Point	USA	2-75 RGR	53168238	653160	3982380	19980128	19980130	3
Point	CIV	DDSO	66608010	666600	3980100	19980130	19980130	1
Point	USNAVY	NMCB 3	67107980	667100	3979800	19980203	19980203	1
Point	USNAVY	NMCB 3	55708200	655700	3982000	19980203	19980203	1
Point	USMC	3 LAR	67107975	667100	3979750	19980210	19980213	4
Point	USNAVY	31 NCR	62708340	662700	3983400	19980210	19980211	2
Point	USNAVY	31 NCR	59307830	659300	3978300	19980210	19980211	2
Point	USNAVY	NMCB 4	68437890	668430	3978900	19980213	19980213	1
Point	USNAVY	NMCB 4	55188152	655180	3981520	19980213	19980213	1
Point	USMC	2-23	63608140	663600	3981400	19980306	19980306	1
Point	USMC	HQ 23	63408650	663400	3986500	19980307	19980307	1
Point	USMC	2-23	62208040	662200	3980400	19980307	19980307	1
Point	USAR	341 MP	54509375	654500	3993750	19980307	19980307	1
Point	USMC	HQ23	62908790	662900	3987900	19980307	19980308	2
Point	USNAVY	SEAL TEAM 3	54038216	654030	3982160	19980310	19980310	1
Point	USNAVY	31 NCR	62808160	662800	3981600	19980317	19980317	1
Point	USNAVY	31 NCR	69507680	669500	3976800	19980317	19980317	1
Point	USNAVY	31 NCR	69107676	669100	3976760	19980318	19980326	9
Point	USNAVY	31 NCR	62508190	662500	3981900	19980318	19980318	1
Point	USNAVY	31 NCR	69257670	669250	3976700	19980318	19980318	1
Point	USMC	3-7	50559277	650550	3992770	19980318	19980318	1
Point	USMC	3-7	44609420	644600	3994200	19980319	19980322	4
Point	USNAVY	31 NCR	62788330	662780	3983300	19980319	19980328	6
Point	USMC	3-7	46509370	646500	3993700	19980319	19980322	4
Point	USMC	3-7	47409310	647400	3993100	19980319	19980322	4
Point	USMC	3-7	44609120	644600	3991200	19980319	19980322	4
Point	USNAVY	31 NCR	69757635	669750	3976350	19980319	19980328	10
Point	USNAVY	31 NCR	66607980	666600	3979800	19980321	19980321	1
Point	USNAVY	31 NCR	63808120	663800	3981200	19980323	19980326	4
Point	CIV	DDSO	53108230	653100	3982300	19980324	19980402	10
Point	USNAVY	CCG-1	53707980	653700	3979800	19980326	19980326	1



Point locations receive an index based on the number of troops using an area and the length of time that location was occupied.

Training Area Use at Fort Hunter Liggett, CA:

**May-December 1997**

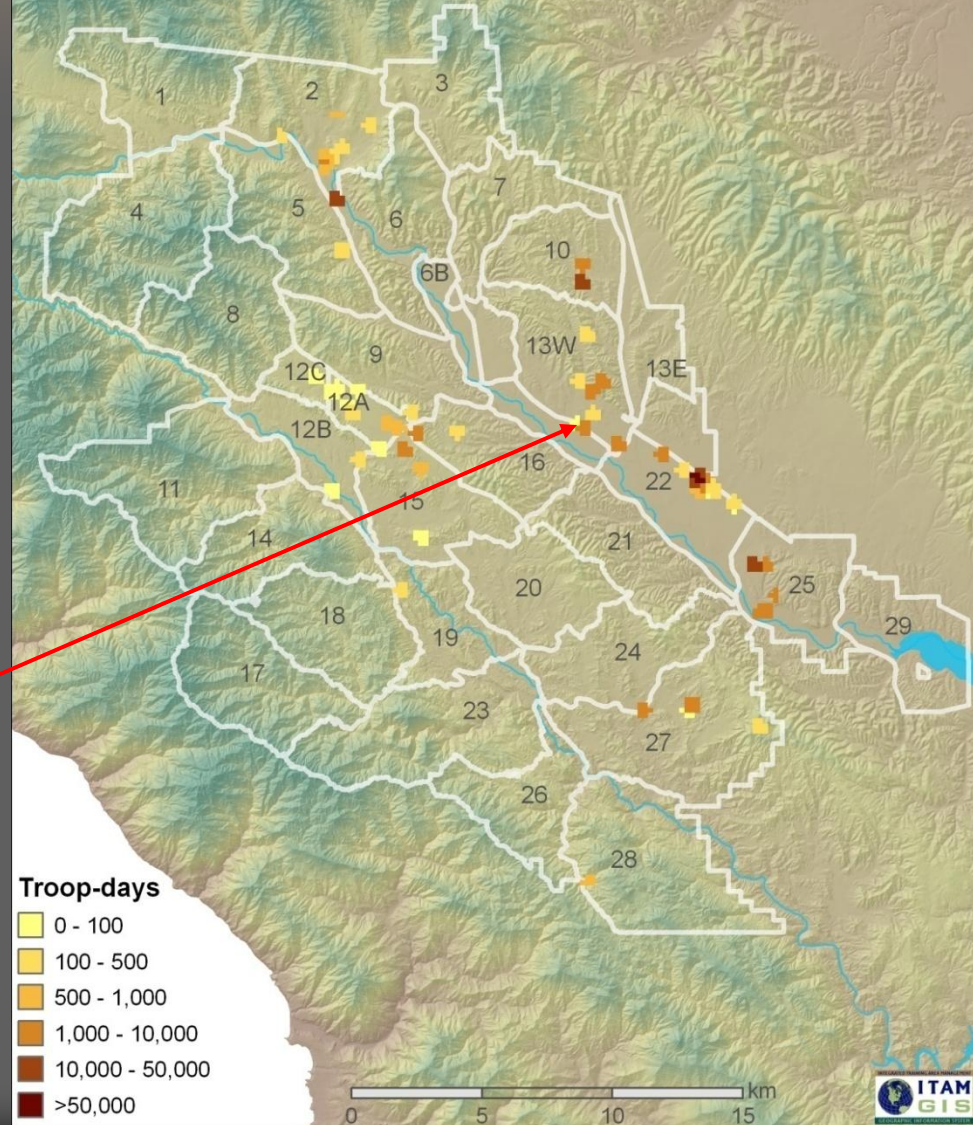


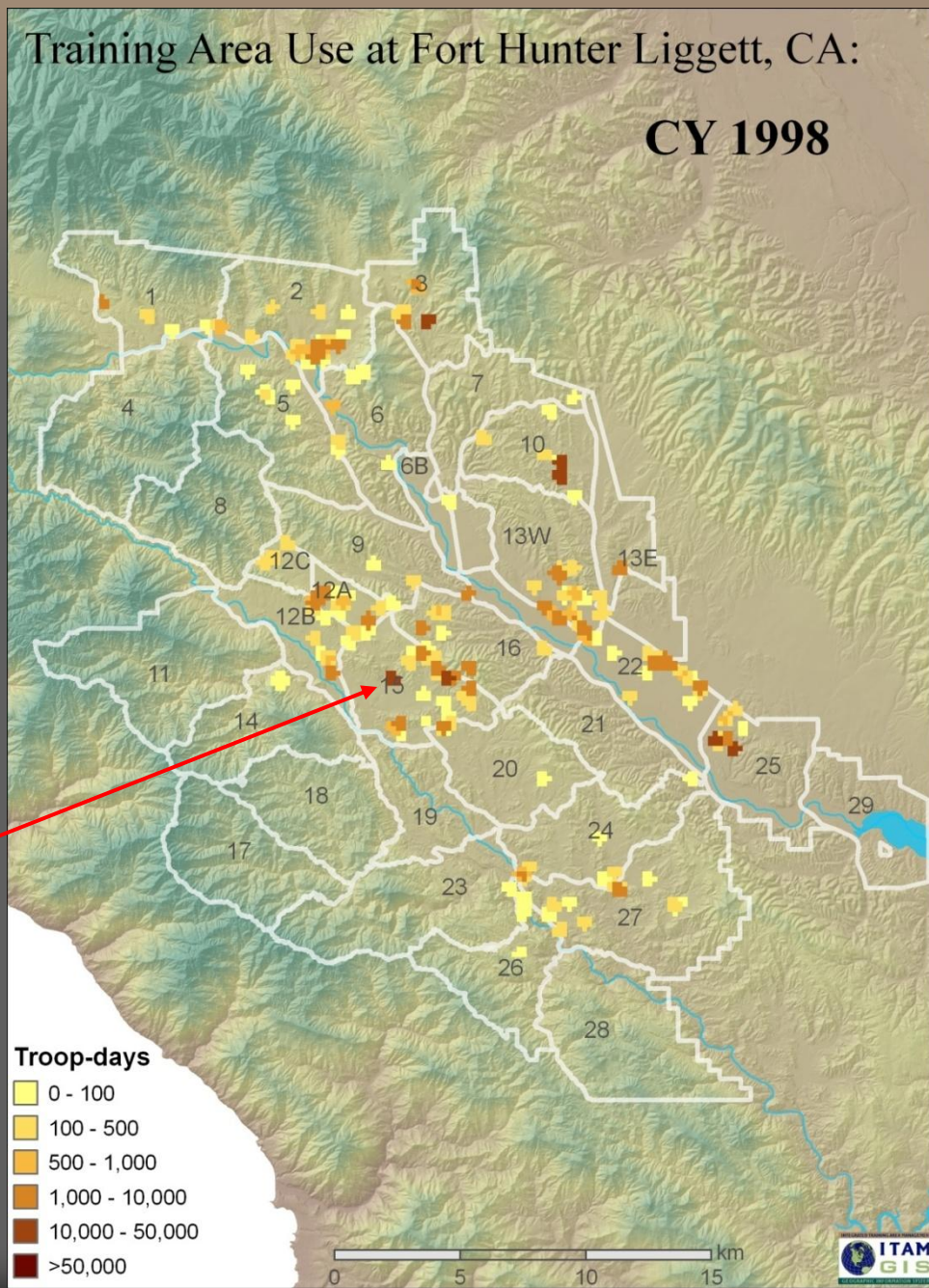
Photo by Ken Spencer – former ITAM Coordinator



These data are then used to spatially and temporally analyze military use of Fort Hunter Liggett's training areas and provide valuable information for:



Photo by SFC Heath Wills



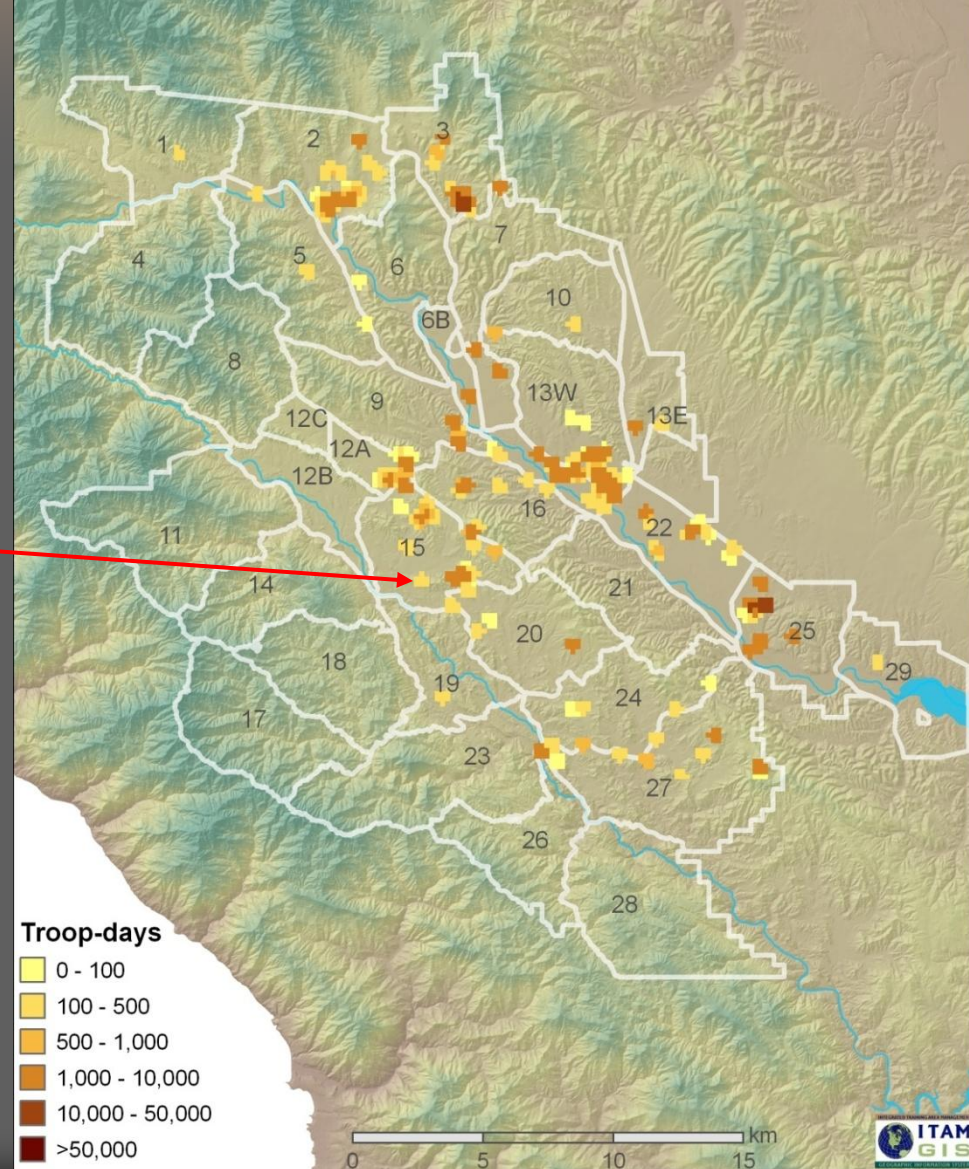


Providing additional quantitative data to correlate with RTLA statistical analysis of military disturbance patterns.



Photo by Meredith Osborn – former RTLA Coordinator

## Training Area Use at Fort Hunter Liggett, CA: CY 1999





# Determining and prioritizing areas for LRAM projects.

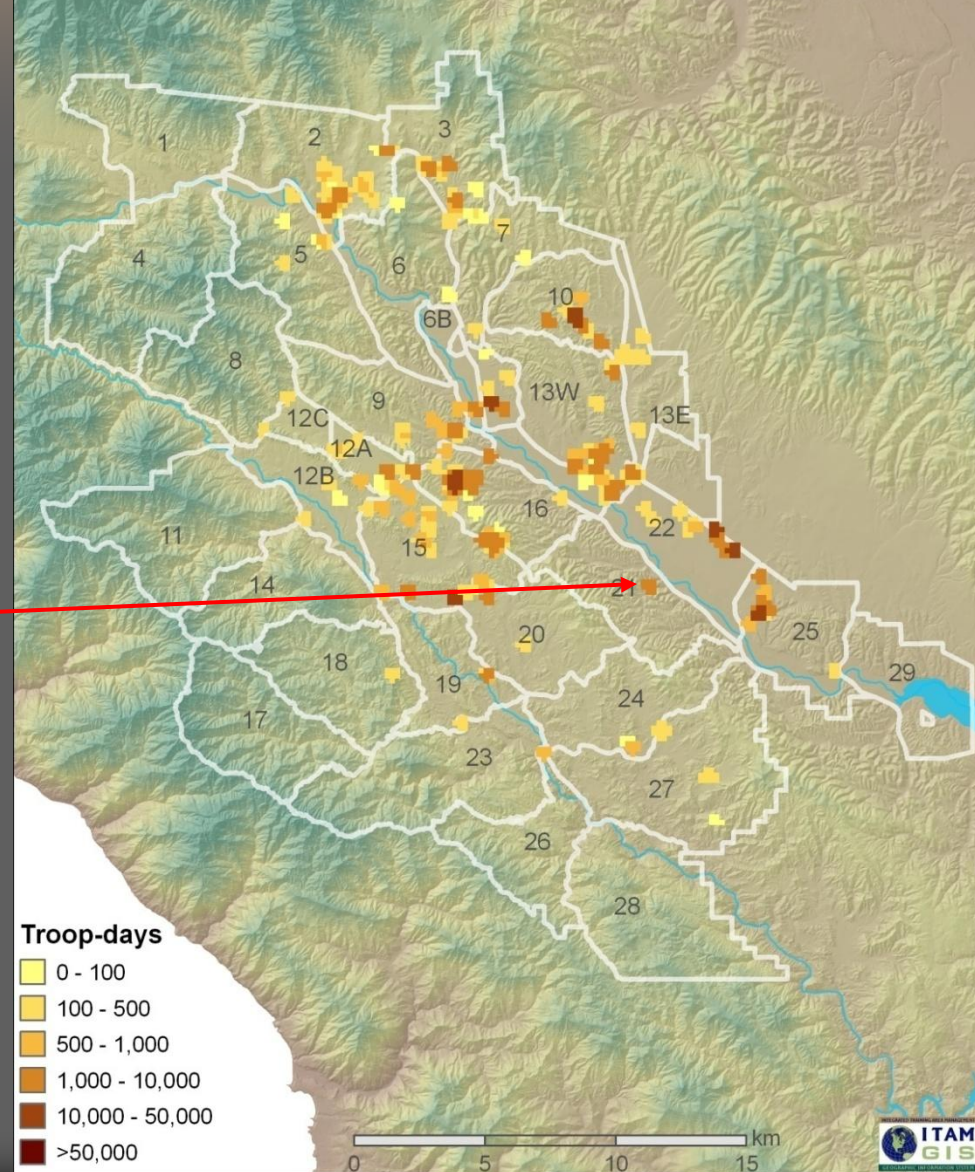


Photo by Ken Spencer – former ITAM Coordinator



Photo by Art Watson - FHL Training Manager

## Training Area Use at Fort Hunter Liggett, CA: CY 2000

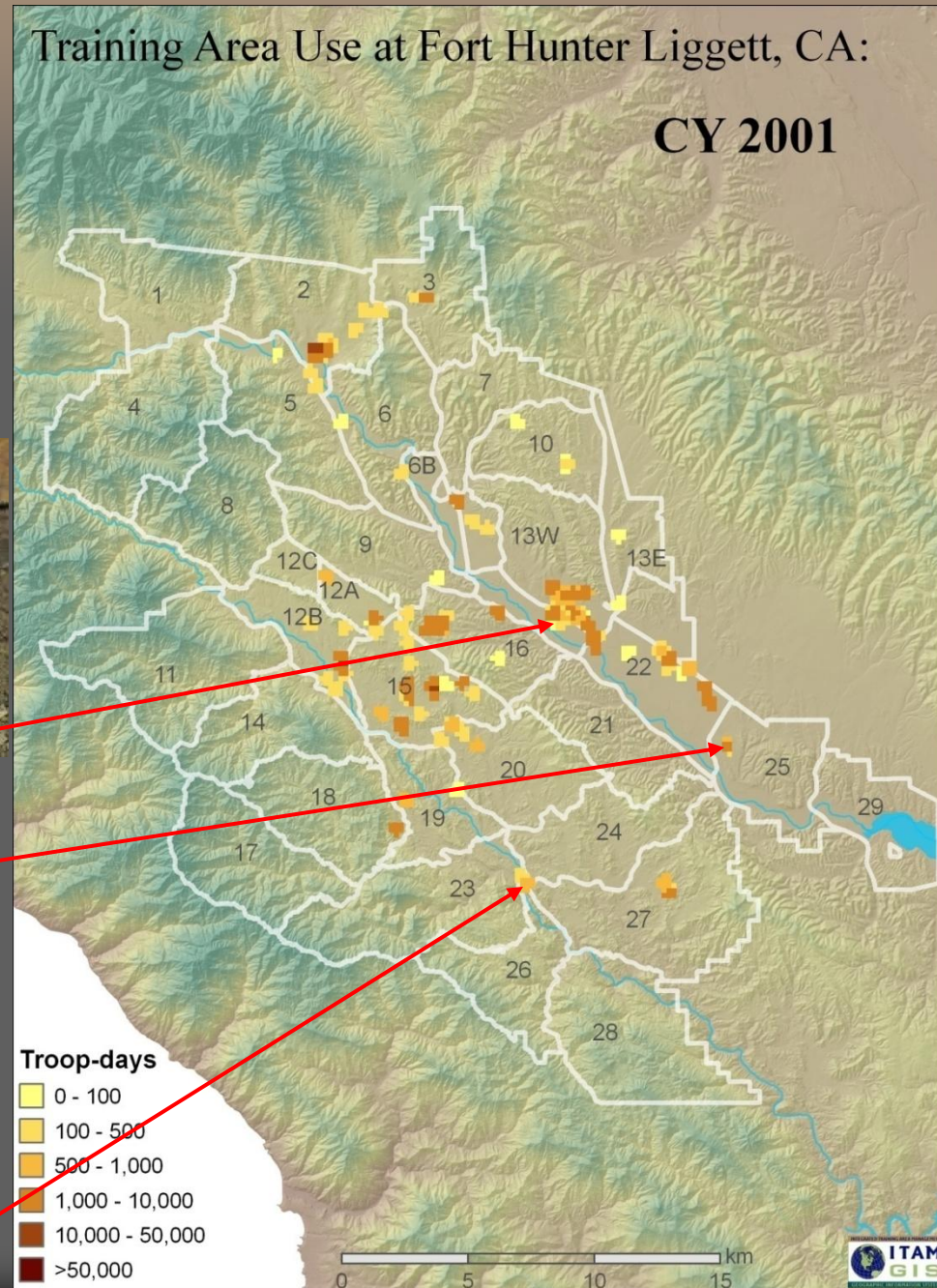




Assess military compatibility and/or potential impacts to sensitive cultural and natural resources with training activities.

Training Area Use at Fort Hunter Liggett, CA:

CY 2001



Arroyo Toad – Fed. Endangered



Purple amole – Fed. Threatened



Rock mortars – Salinan People



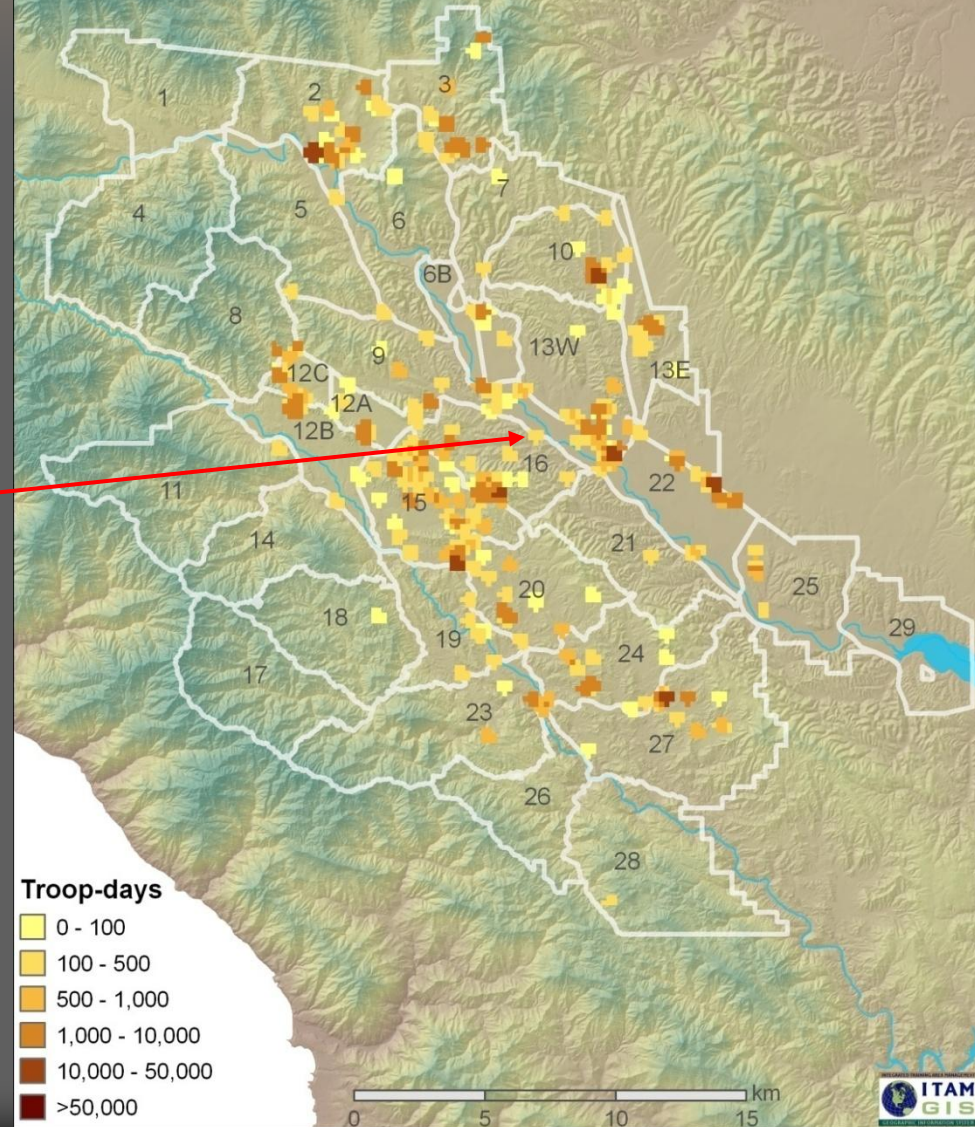
Tracking use by, and  
clearing individual  
units from the field.



Photo by SFC Heath Wills

Training Area Use at Fort Hunter Liggett, CA:

**CY 2002**





# Determining UXO Potential



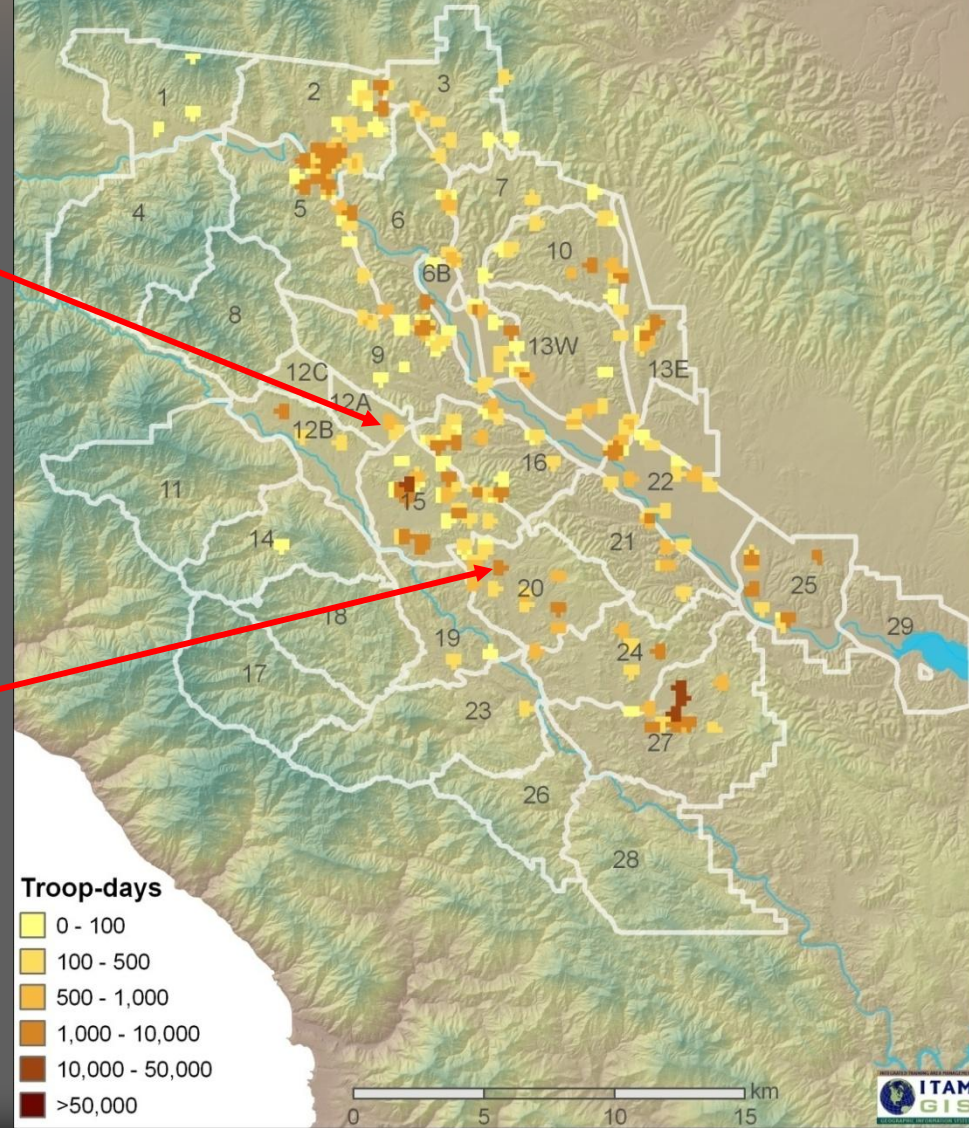
Photo by Ken Spencer – former ITAM Coordinator



Photo by Art Watson - FHL Training Manager

Training Area Use at Fort Hunter Liggett, CA:

**CY 2003**





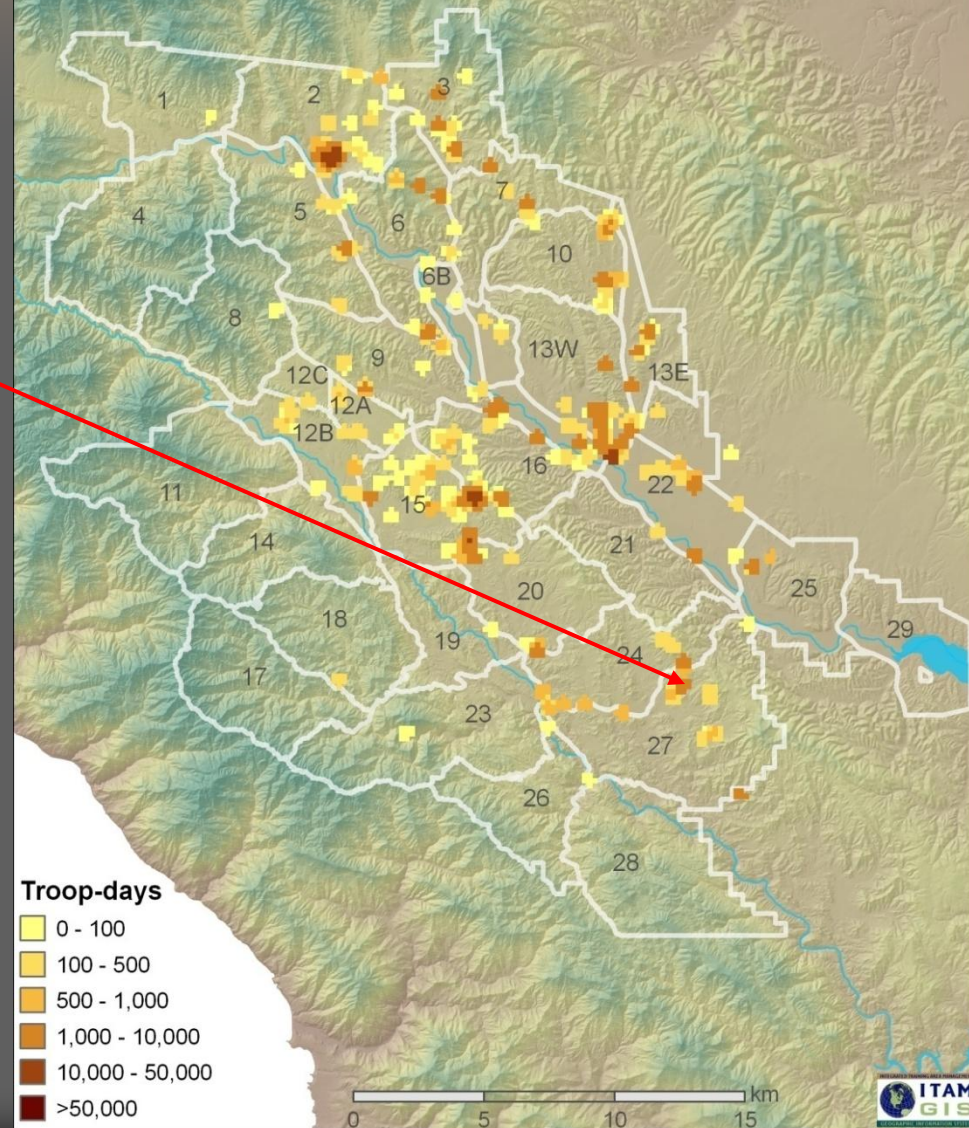
# TTB/TOC/Bivouac use and expansion tracking (mission creep).



Photo by Art Hazebrook

TTB = Tactical Training Base - CONUS  
FOB = Forward Operating Base – Theatre  
TOC = Tactical Operations Center

## Training Area Use at Fort Hunter Liggett, CA: CY 2004





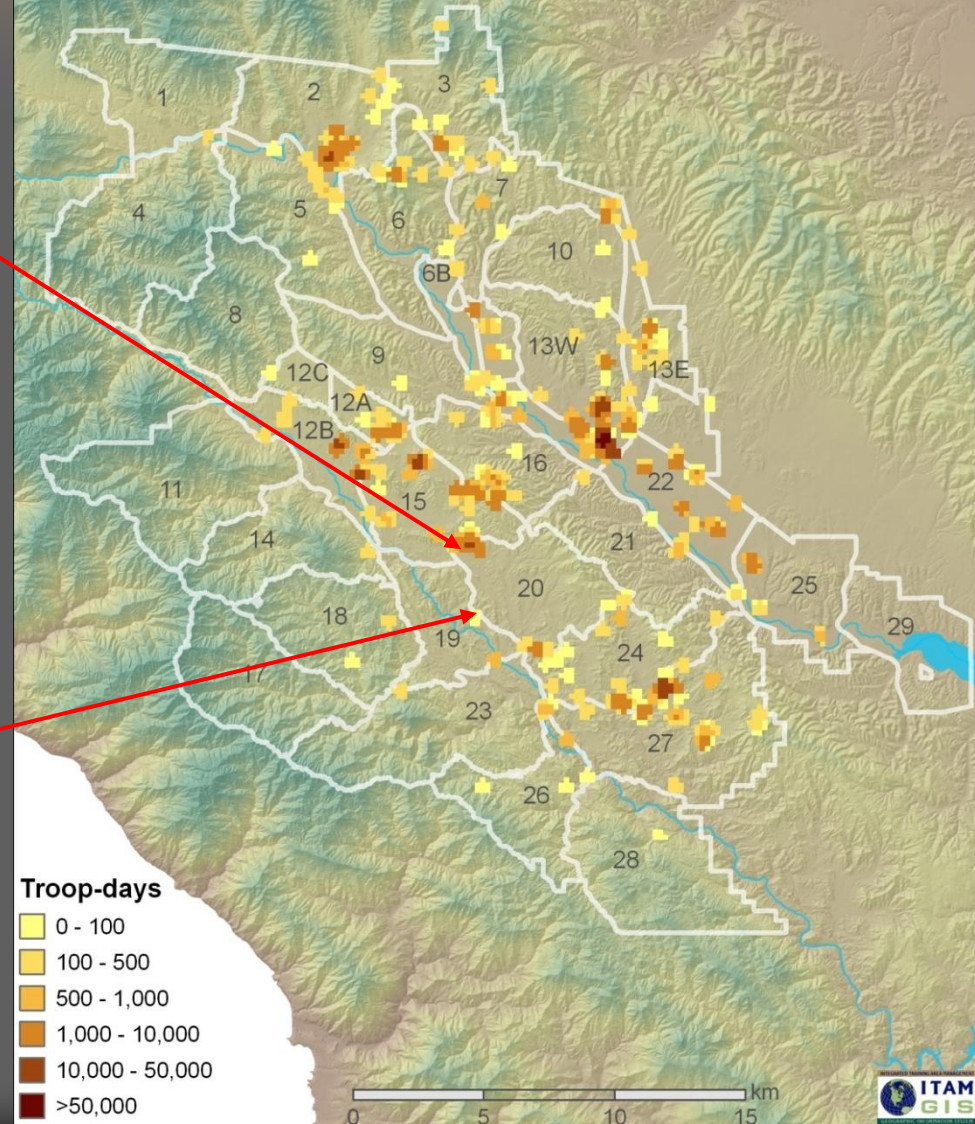
# Convoy Live Fire Exercise



Photo's by LTC David Phillips-DPTMS FY05-07

Training Area Use at Fort Hunter Liggett, CA:

**CY 2005**





# Training Area Use 1998-2008

Training Area Use at Fort Hunter Liggett, CA:  
CY 1997 - 2008

TTB Milpitas

TTB 'Cantonment'

TTB Schoonover

TTB 8J

TTB Ward

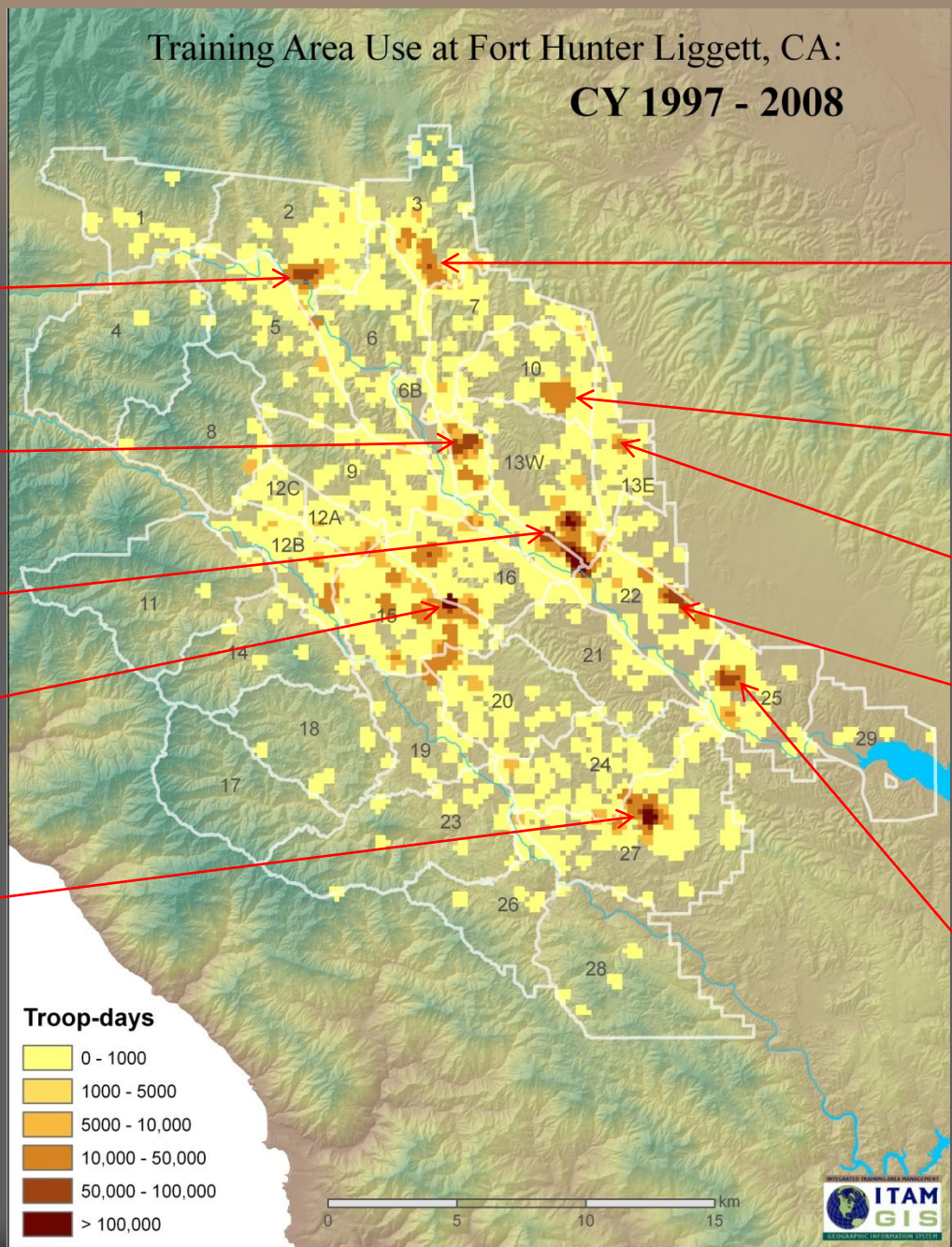
Sea Bee  
TOC

Land Nav.  
West

Land Nav.  
East

M16 and  
Pistol Qual.  
Ranges

Engineer  
Unit  
Dig Zone



# Training Area 25: Case Study

- Historic Engineering unit dig zone and bivouac area
- Home to a large population of federally listed (FY 2000) purple amole
- One incident (Nov. 2000) of Engineers driving off-road during wet season and outside dig-zone results in more stringent Environmental Review process for the TA.



**Purple Amole**

(*Chlorogalum purpureum* var. *purpureum*)

Fed. Threatened, CNPS 1B.1

Photo by Laura Ann Eliassen



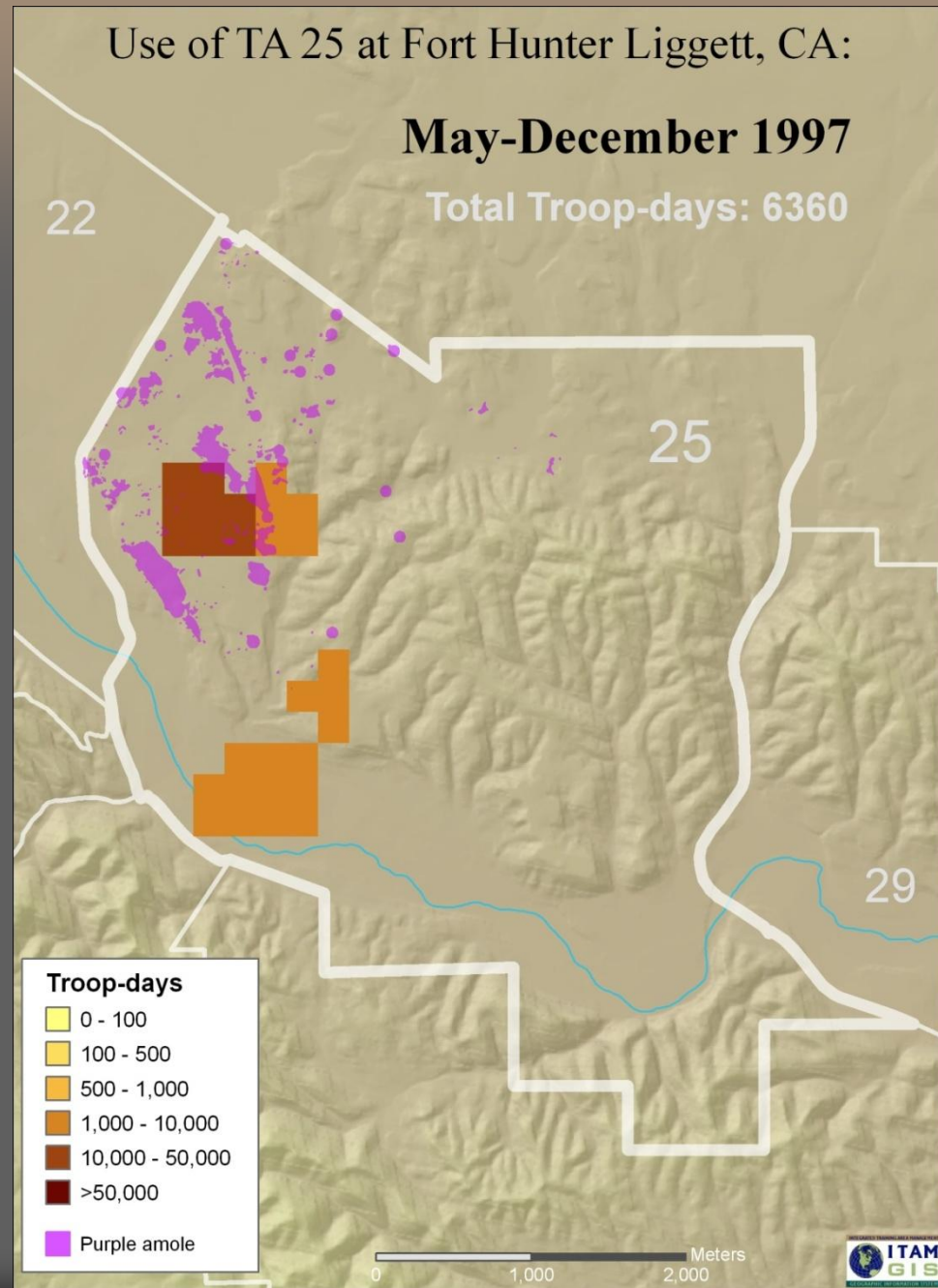
**1997**

**6360 troop days**

GIS output pixel size was set to 200 meters due to the inherent coarseness of the input data

GIS neighborhood was set to 300 meters

GIS units of output (pixels) = troop-days/km<sup>2</sup>

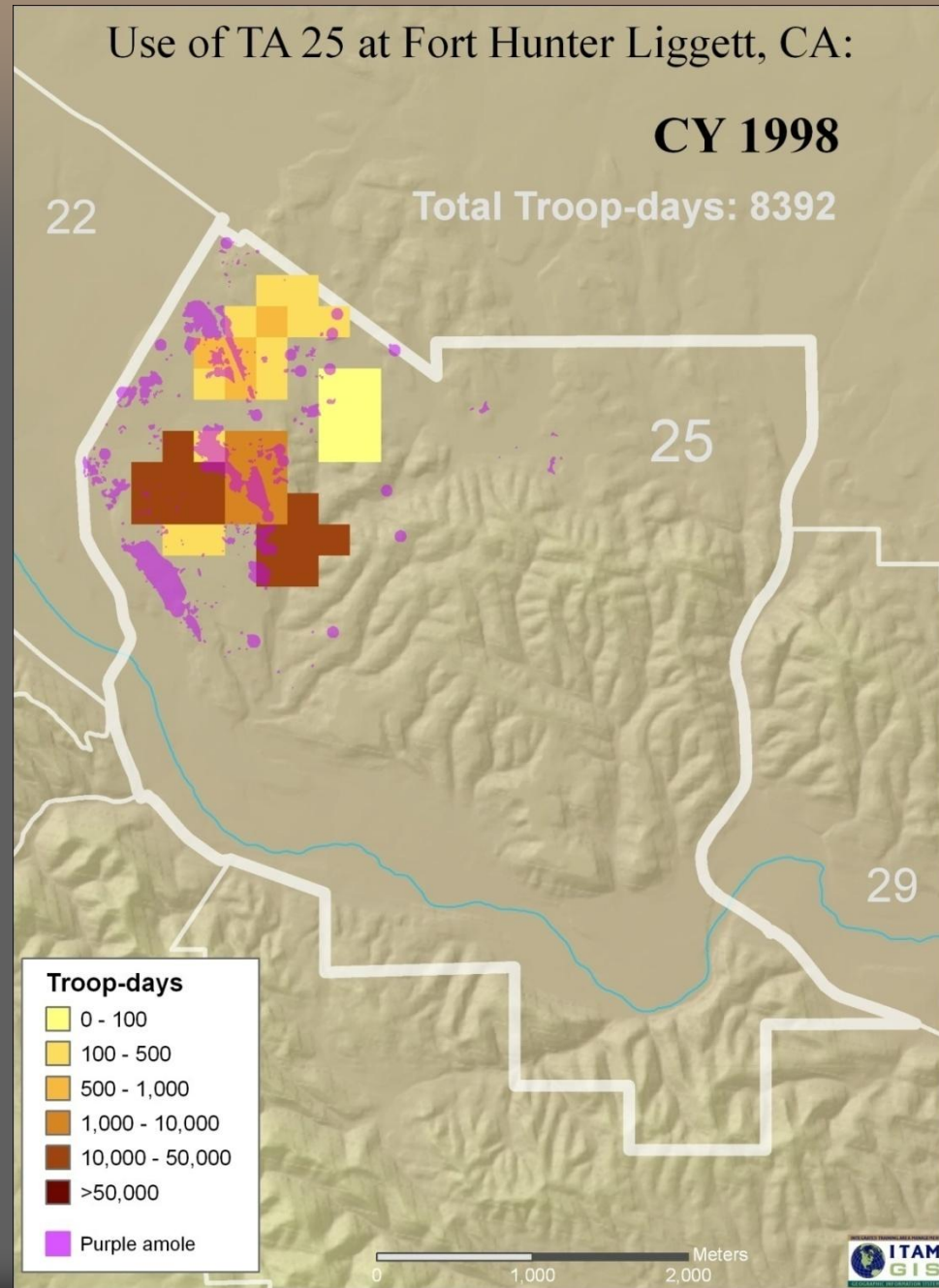


# 1998

## 8392 troop days

Training Area has been heavily used during the past 40 years.

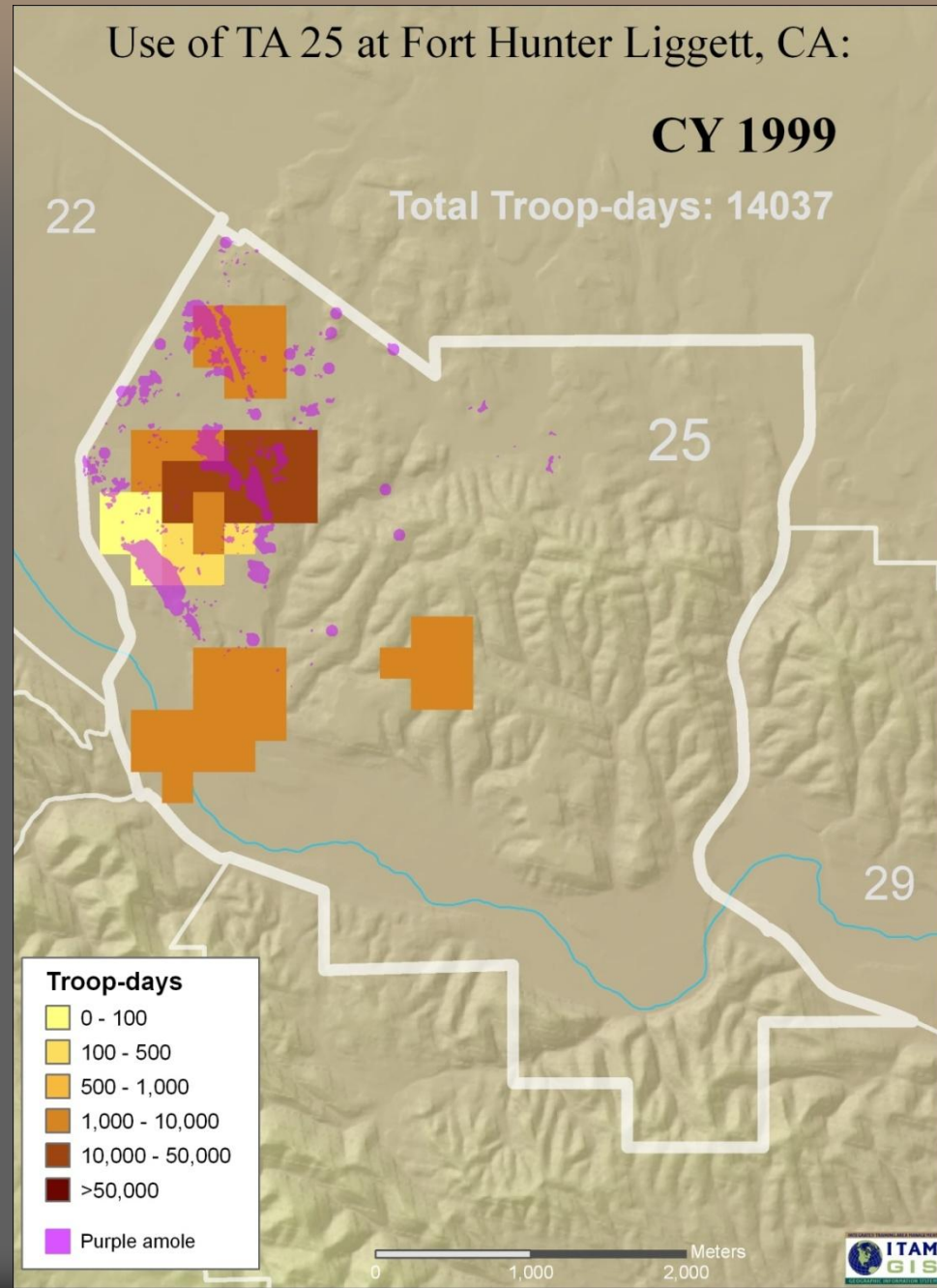
Personal observations suggest that purple amole does well with moderate soil compaction and disturbance which reduces competition from other plants.



**1999**

**14037 troop days**

An unusually dry winter results in unprecedented use of the training area.

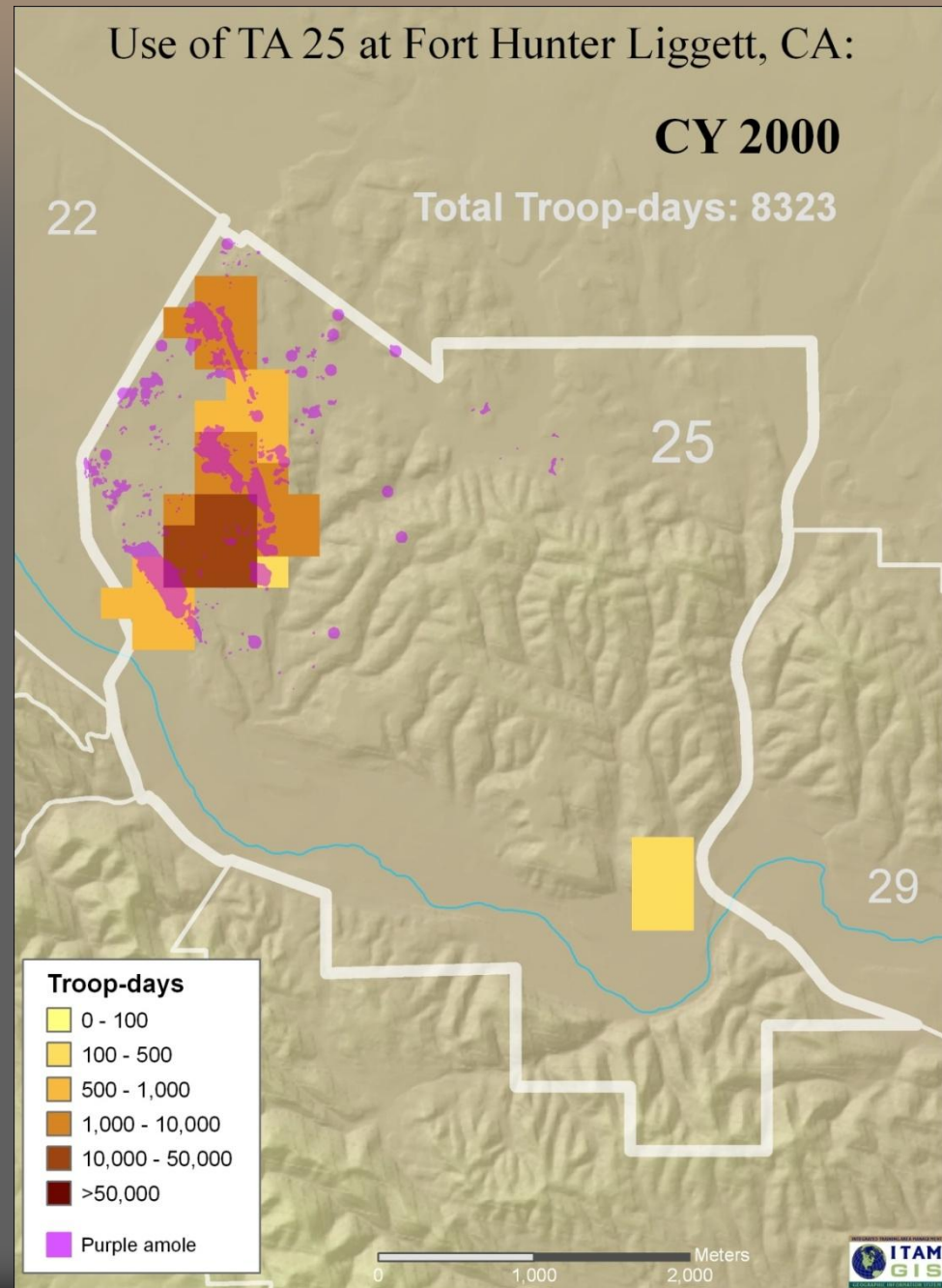




**2000**

**8323 troop days**

Unauthorized off-road use of heavy equipment during the wet winter months (Nov.-Dec.) results severe disturbance of one part of the purple amole population in TA 25.



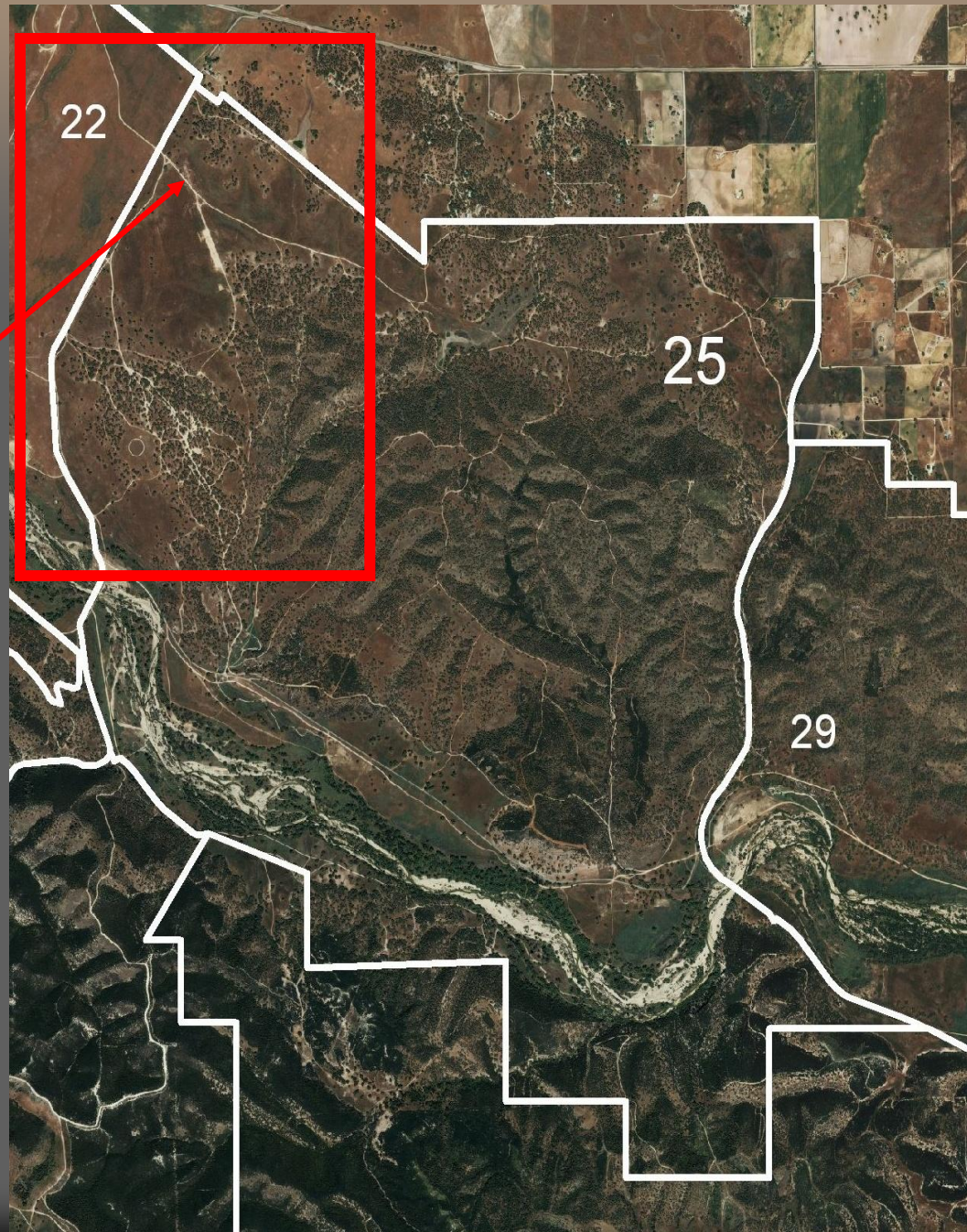


2000

8323 troop days



Site 2 weeks after  
disturbance



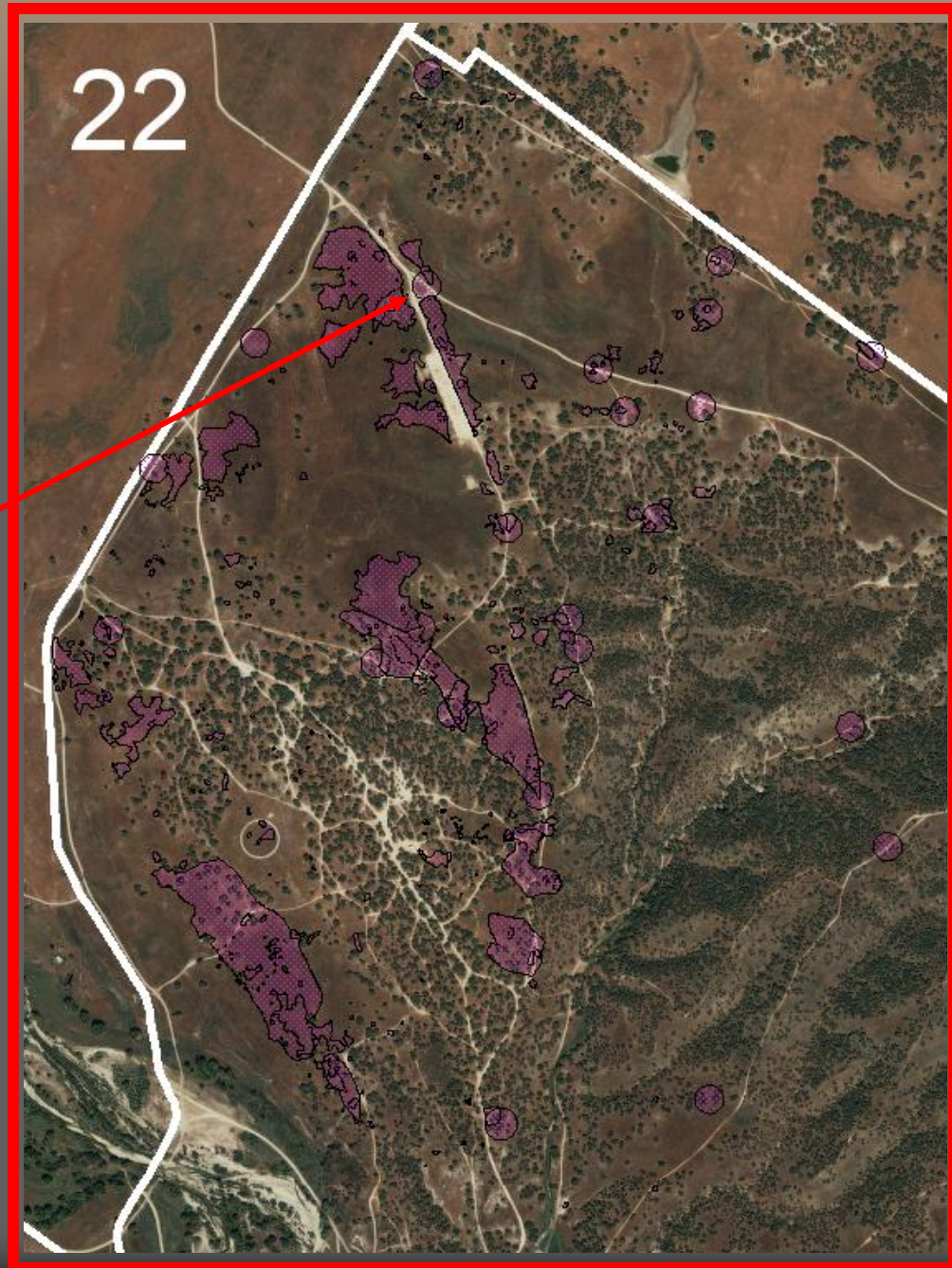


2000

8323 troop days



Site one month after disturbance: Note track and wheel ruts evident after re-grading.



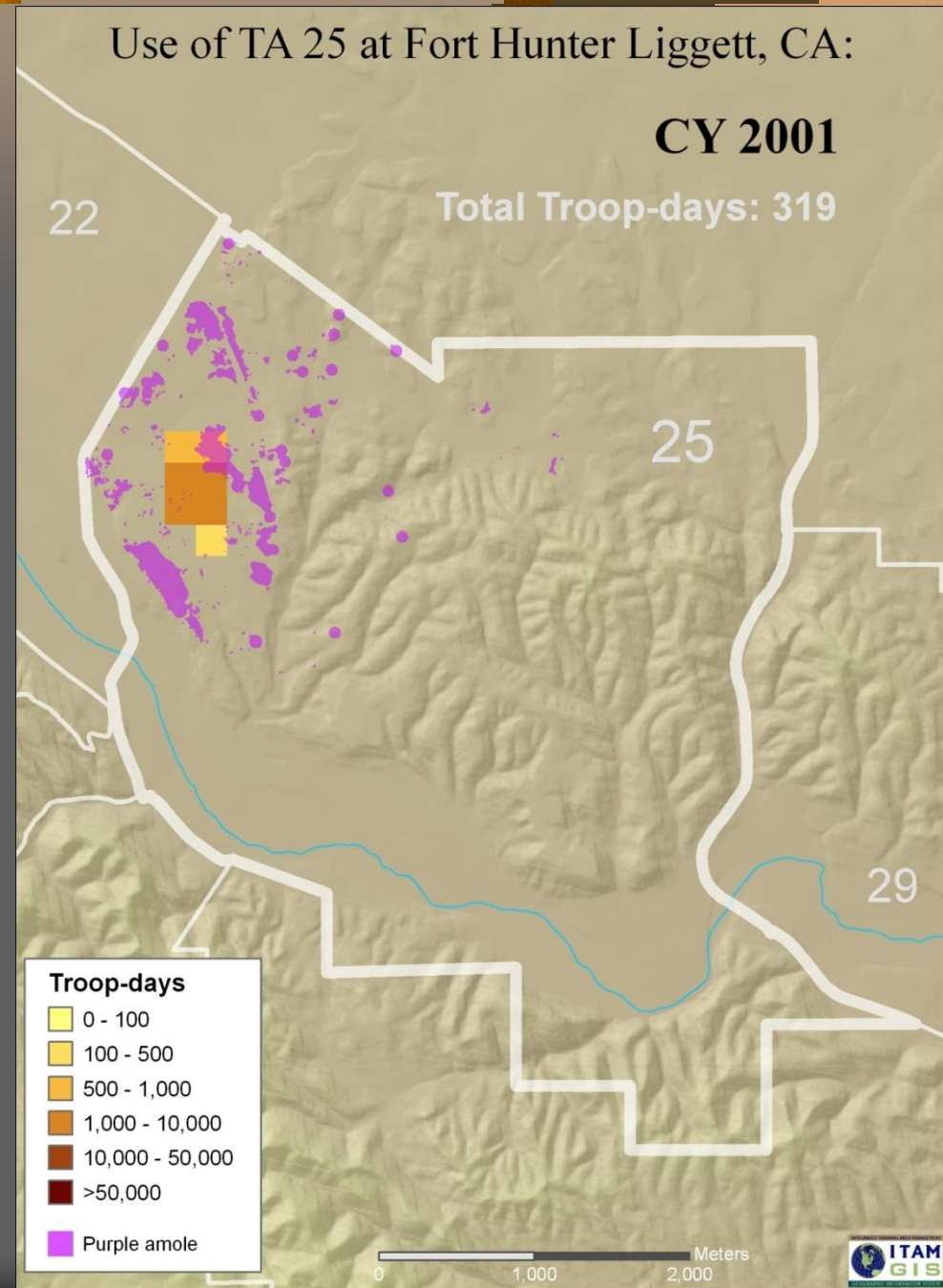


**2001**

**319 troop days**

Training Area use restricted  
to summer

“On-Road Wheeled Vehicle  
Use Only”





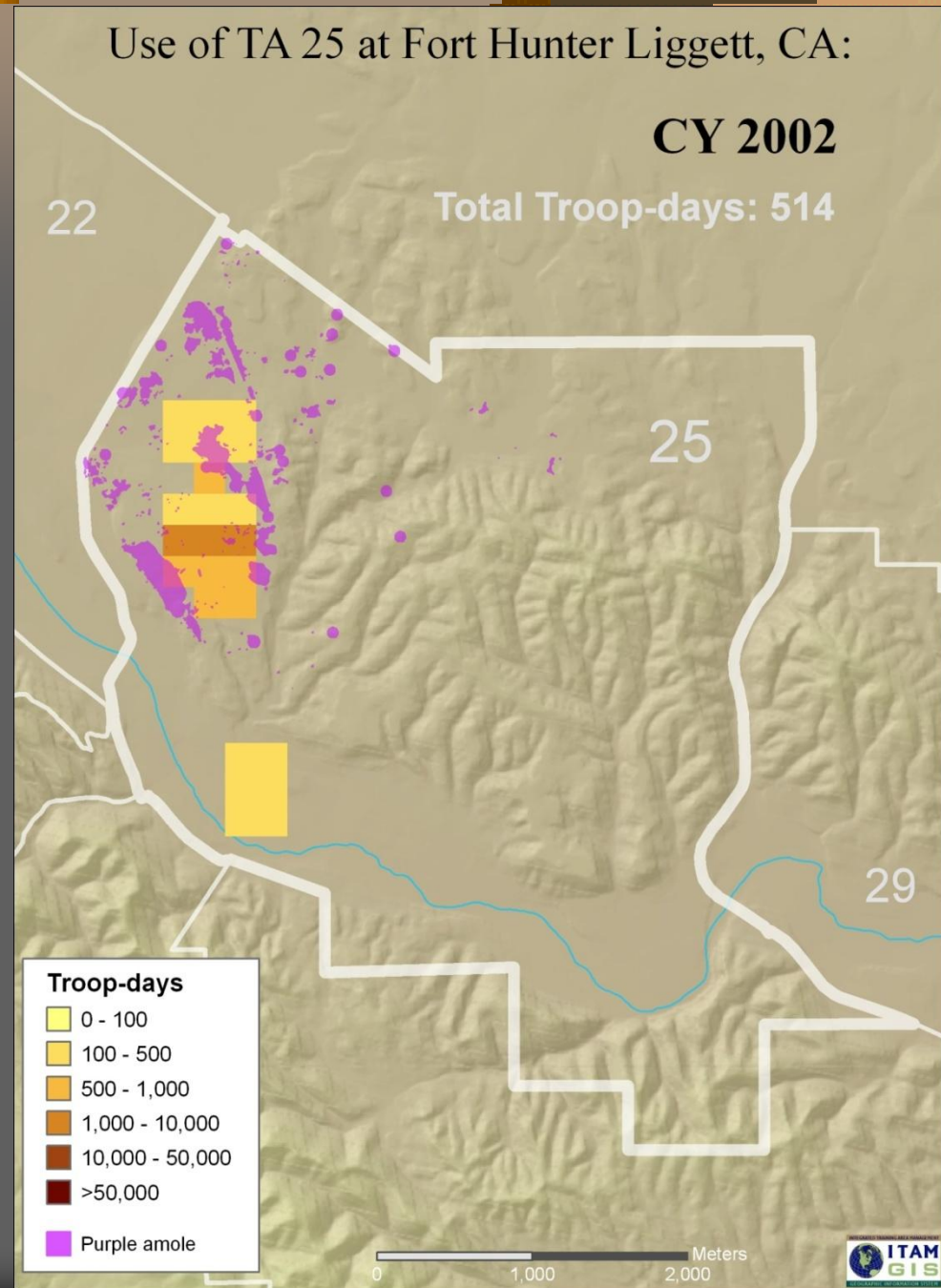
**2002**

**514 troop days**

Training Area use relaxed  
to summer :

**“On/Off-Road Wheeled  
Vehicle Use Only”**

- after the ground firms up,
- after purple amole has set seed.

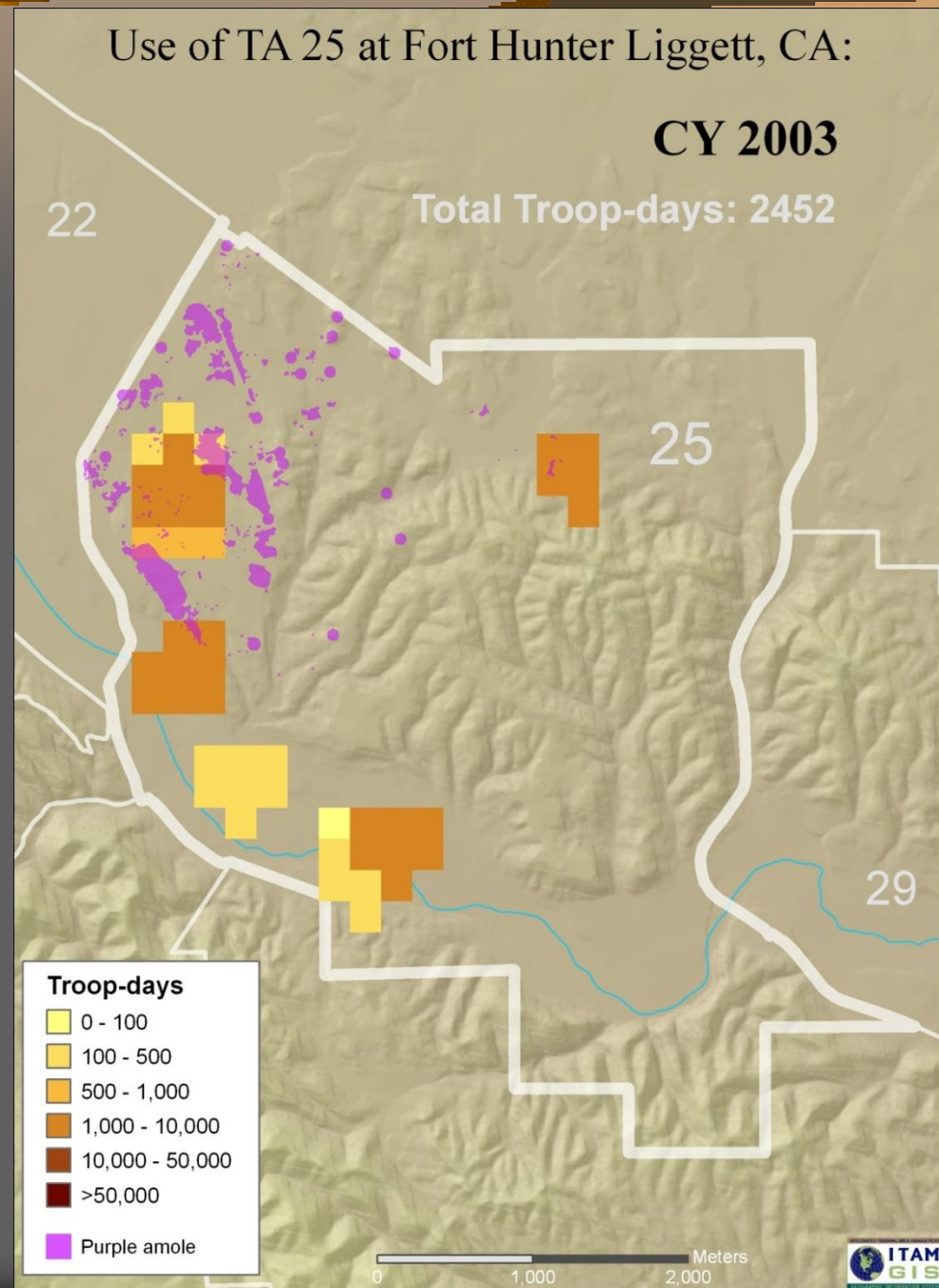




**2003**

**2452 troop days**

Units are rediscovering old dig zones or creating new zones in the SW portion of the TA away from purple amole populations.

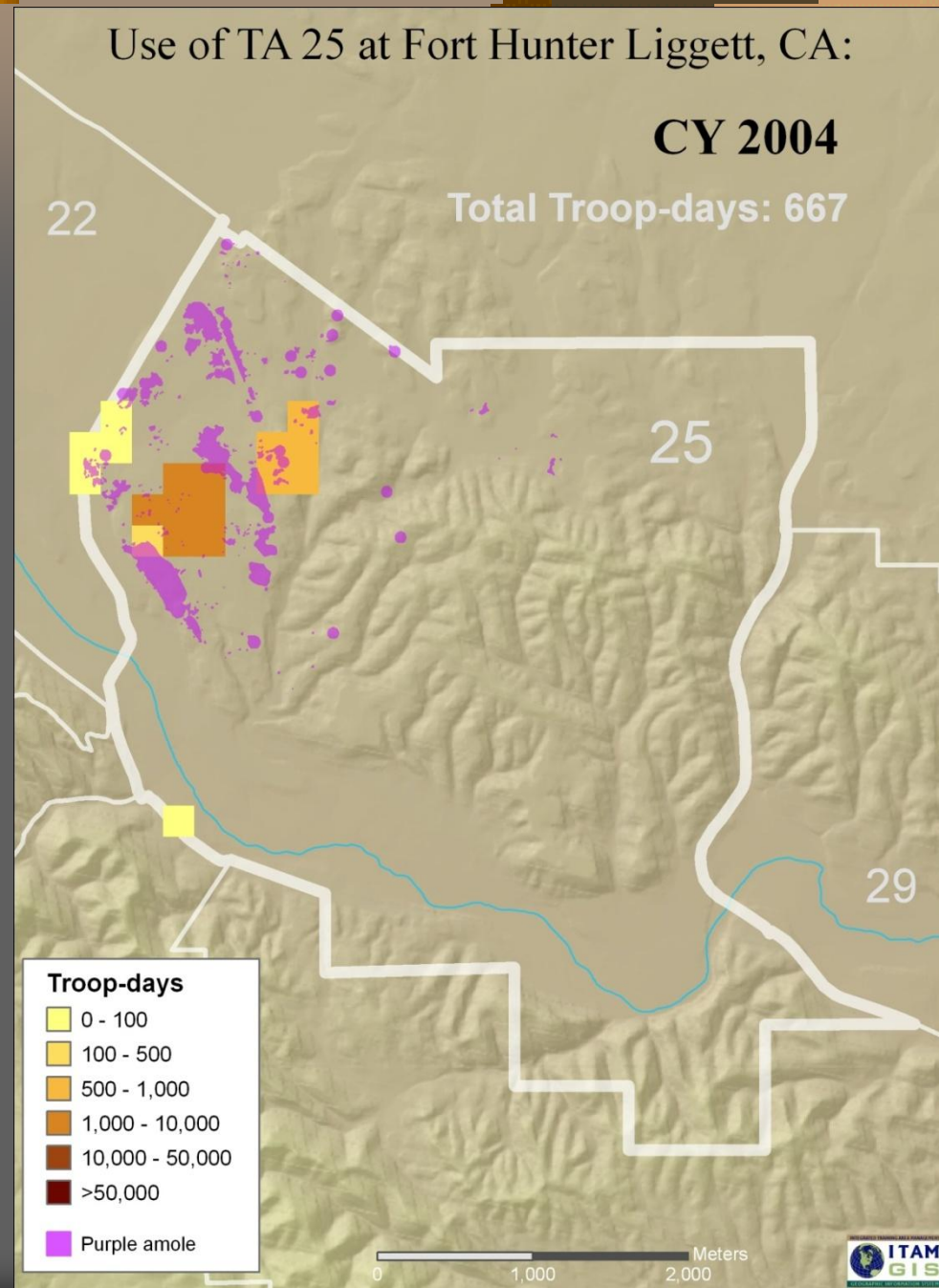




# 2004

## 667 troop days

A large number of Engineering Units (Army National Guard & NAVY) have been deployed to Iraq in the last few years resulting in low training numbers for this Training Area.

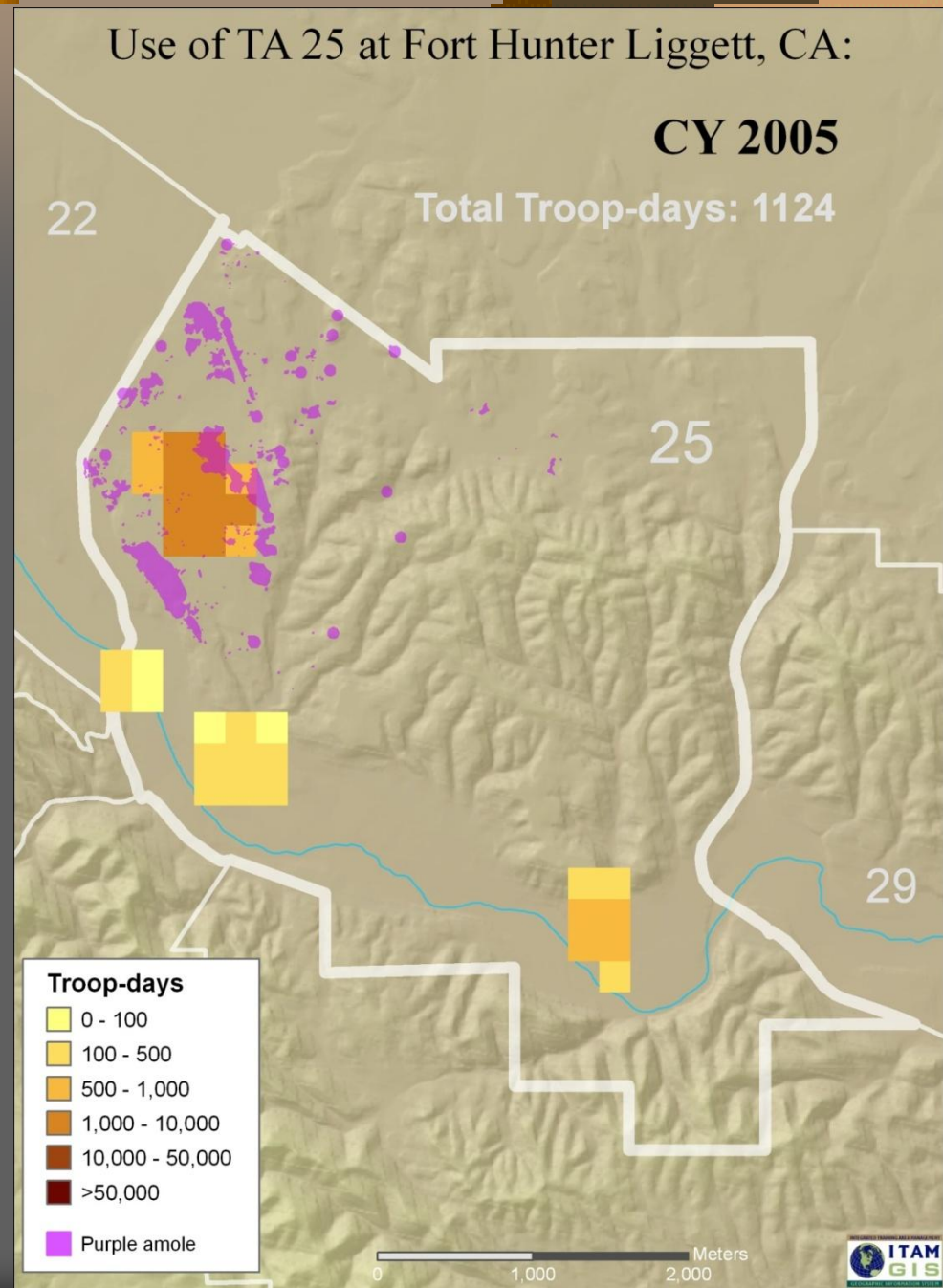




**2005**

**1124 troop days**

Engineering Units begin  
cycling back through FHL  
in preparation for  
redeployment.

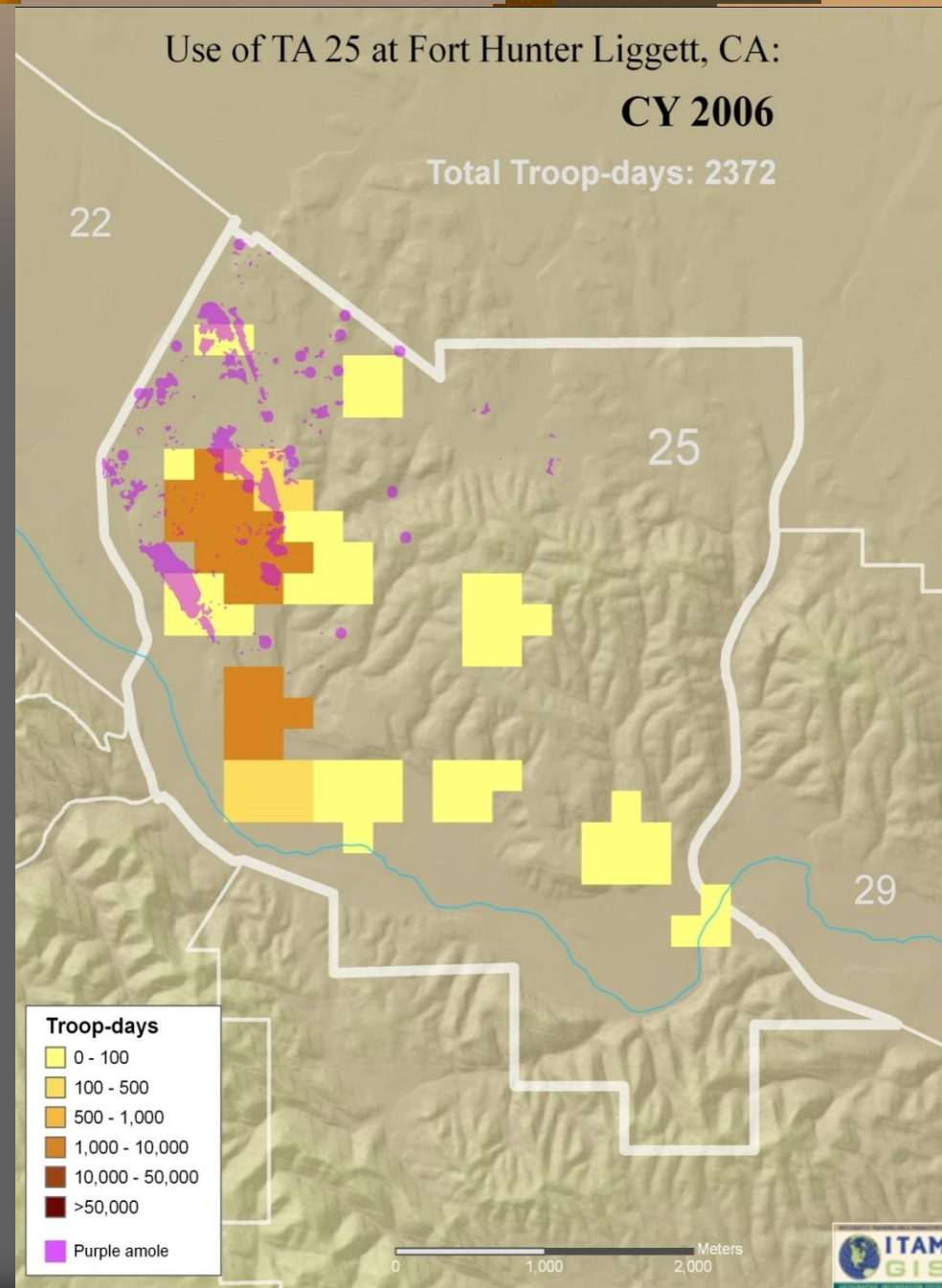




**2006**

**2372 troop days**

Engineering Units use of  
TA 25 continues to expand  
into previously used sites.





**The End...**





# Questions?

